

### ABSTRACT

A real-time calibration method for beam profile ellipsometry systems includes projecting an electromagnetic probe beam having a known polarization state through an objective lens onto the surface of a subject and collecting the reflected probe beam using  
5 the same objective. The reflected probe beam is then passed through a rotating compensator and analyzer before being received by a detector. A processor performs a harmonic analysis on the detector output to determine normalized Fourier coefficients. The processor uses Fourier coefficients to measure the retardation  $\delta_B$  and the azimuth angle  $Q_B$  of the objective lens; and uses the retardation  $\delta_B$  and the azimuth angle  $Q_B$  to  
10 identify the ellipsometric effects of the objective lens.